Intro To R

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Getting Started

Let's get started with some basic R commands and best practices. For any scripts your produce, always annotate and mark your code. To comment in R, just input a # before your notes.

```
# This is a comment.
```

When you have questions, use the help function. A question mark serves as a shortcut.

```
? mean
```

Packages

Load all packages and dependencies at the start of your code. Depending on the package, some installations take longer than others. Quotes are required, and there are multiple options. Check the source documentations when you have questions.

```
# install.packages("lubridate")
```

You only need to install once, but you'll have to import the package each time you open the session.

```
library(rgdal)
library(foreign)
library(lubridate)
```

Your Working Directory

To get the path of the current working directory:

```
getwd()
```

```
## [1] "/Users/Masia/Code/IntroRSpatialStats"
```

To list the content of the working directory:

```
dir()
```

```
## [1] "IntroR.html" "IntroR.pdf"  "IntroR.R"    "IntroR.Rmd"  "RMarkdown.R"
```

Set the working directory, if it's not where you need it to be. Careful here!

```
# setwd('/code/IntroRSpatialStats')
```

It's helpful to keep all related files for your session in a folder set to your working directory.

Simple Operations

Addition and other simple operations:

```
4+1
```

```
## [1] 5
```

Assign the variable "x" to result

```
x = 4+1
```

Call your variable.

```
x
```

```
## [1] 5
```

Coding Style

There are a few ways of assigning things in R...

```
x<- 4+1
x
```

```
## [1] 5
```

They are equivalent.

```
4+1 ->x
x
```

```
## [1] 5
```

Variable Assignment

Assign "x" to a numeric value.

```
x<- 10
```

Assign "x" to a string. Both delimiter types are okay

```
x<- 'ducks in a row'
x<- "ducks in a row"
```

Careful when using an apostrophe, however:

```
# x<- 'edward's house'
x <- "edward's house"
x
```

```
## [1] "edward's house"
```

Data Structures

Knowing the internal structure of an R object is essential to successful work in data analysis. Use the str() function to check the data structure.

```
str(x)
```

```
##  chr "edward's house"
```

```
x<- 10.0
str(x)
```

```
##  num 10
```

Vectors and Sequences

Define a numeric vector

```
x<- c(0,1,5,6,12,120)
x
```

```
## [1]   0   1   5   6  12 120
```

Define a sequence.

```
x<- -4:8
x
```

```
##  [1] -4 -3 -2 -1  0  1  2  3  4  5  6  7  8
```

Basic Summary Statistics

```
sum(x)
```

```
## [1] 26
```

```
mean(x)
```

```
## [1] 2
```

```
sd(x)
```

```
## [1] 3.89444
```

```
var(x)
```

```
## [1] 15.16667
```

Compute the sample mean with the function "mean"

```
sum(x)/length(x)
```

```
## [1] 2
```

Compute the length of a vector

```
length(x)
```

```
## [1] 13
```

Elementwise operations

```
x<- 1:10
y<- 11:20
x*y
```

```
##  [1]  11  24  39  56  75  96 119 144 171 200
```

```
x+y
```

```
##  [1] 12 14 16 18 20 22 24 26 28 30
```

Using indices

To access the element of a vector, use the index

```
x<- c(5,3,6,7,5,8)
x[c(1,2)]
```

```
## [1] 5 3
```

```
w<- x[c(5,9)]
w
```

```
## [1]  5 NA
```

```
x[1:4]
```

```
## [1] 5 3 6 7
```

Working with Vectors

```
x
```

```
## [1] 5 3 6 7 5 8
```

```
mean(x[1:4])
```

```
## [1] 5.25
```

```
x > 5 # Index with boolean vector
```

```
## [1] FALSE FALSE  TRUE  TRUE FALSE  TRUE
```

```
x[-1] # Negative Indexing in R
```

```
## [1] 3 6 7 5 8
```

If Else Statements

The "if" clause. Syntax: if (condition) {action} else {action}

An example: - if (length(x)==length(y)) - then print "The lengths are the same" - else print "The lengths are different"

```
x<- 3
y<- c(1,2)
if (length(x)==length(y)) { print("The lengths are the same")
} else { print("The lengths are different") }
```

```
## [1] "The lengths are different"
```

Troubleshooting

When you hit trouble, and there will always be trouble, practice solid troubleshooting skills. Gather as much information as you can regarding the version of your software and hardware specifications, and track existing work you've done to resolve the issue. Copy and paste any error message you receive in Google to see if others have posted similar problems. When all else fails, post a message with your notes on a forum like Stack Exchange (or our course's internal version).